Letter to the Editor

Psychotherapy and Psychosomatics

Received: December 28, 2015
Accepted after revision: April 29, 2016
Published online: August 12, 2016

Psychother Psychosom 2016;85:317–319
DOI: 10.1159/000446584

Internet-Based Cognitive Behavioral Therapy for Social Anxiety with and without Guidance Compared to a Wait List in China: A Propensity Score Study

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Social anxiety disorder (SAD) is one of the most common mental disorders in Western countries. The 12-month prevalence of SAD in China is much lower (0.2%) than in Western countries. However, it translates into an enormous number of people in China (approx. 200 million adult people) in combination with a huge unmet need for treatment of mental disorders [1]. Internet interventions might be an easily accessible and cost-effective way to deliver evidence-based treatment for mental disorders to people who otherwise never would have the opportunity to receive effective treatment. Although there is a wealth of studies that show the efficacy and effectiveness of Internet-based cognitive behavioral therapy (ICBT) in Western countries, there is a considerable lack of studies that investigate the efficacy of such treatments in non-Western countries [2]. So far, several studies have evaluated the efficacy of ICBT for SAD in controlled trials in Western countries with promising results [3]. An important discussion in the field is about the degree of support and guidance needed during Internet-based self-help treatments [4]. The aim of the present study was to investigate the effectiveness of an established self-help program for increased social anxiety in a Chinese population. Additionally, we investigated whether minimal guidance by trained therapists had an incremental value regarding symptom improvement and adherence.

The present study was approved by the local ethics committee. Participants were recruited by announcements on websites and sev-

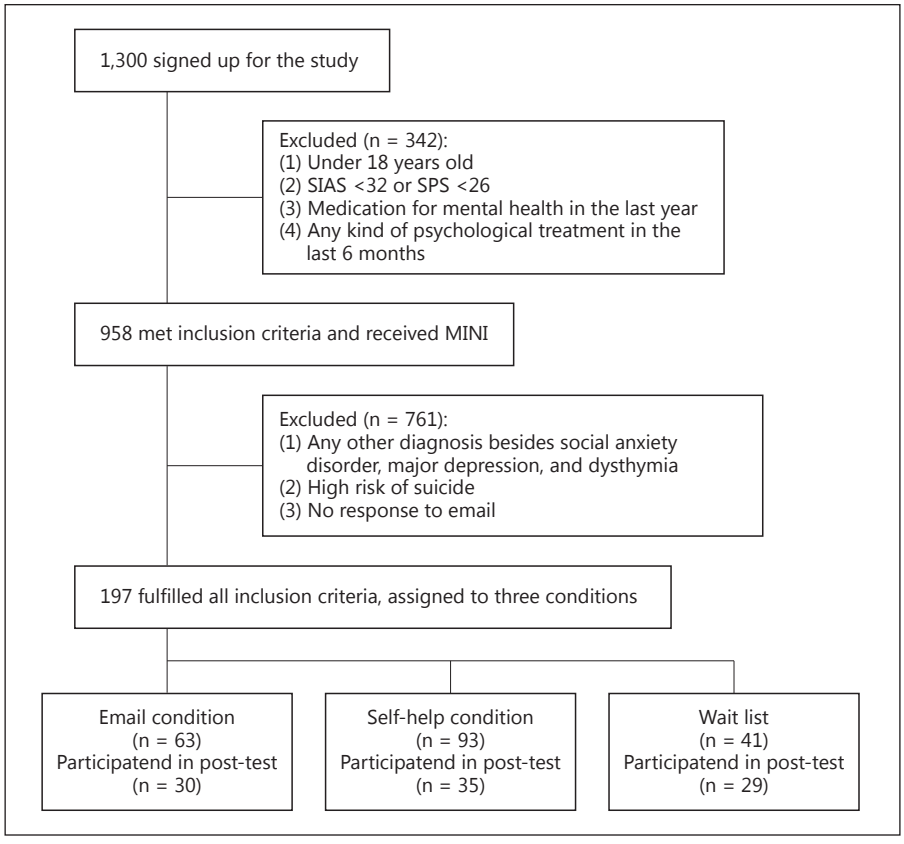

Fig. 1. Inclusion and exclusion criteria for MINI. Post-test = Assessment after 8 weeks.

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Table 1. Observed scores, corresponding within-group effect sizes and estimated marginal means based on mixed regression analyses with PS correction and between-group effect sizes

	Observed scores and within-group effect sizes						Estimated marginal means			Group × time interaction		Between-group effect sizes		
	guided		unguided		wait list		guided[c]	un-guided[c]	wait list[c]			guided vs. wait list	unguided vs. wait list	guided vs. unguided
	mean[a]	*D*[b]	mean[a]	*D*[b]	mean[a]	*D*[b]				*d.f.*	*F*	*d*[b]	*d*[b]	*d*[b]
SIAS														
Pre	46.56± 10.60	1.29 (0.81, 1.75)	48.37± 10.66	1.20 (0.77, 1.60)	49.27± 11.17	0.13 (–0.35, 0.61)	48.17± 1.46	48.25± 1.19	47.52± 1.85	4, 217.33	9.83**	0.06 (–0.34, 0.45)	0.06 (–0.30, 0.43)	0.01 (–0.33, 0.31)
Post	31.53± 13.56		35.03± 12.35		47.66± 13.44		30.54± 1.91	33.39± 1.71	45.48± 2.07			1.03 (0.61, 1.44)	0.78 (0.39, 1.15)	0.18 (–0.14, 0.50)
SPS														
Pre	32.89± 14.74	0.90 (0.44, 1.35)	34.57± 15.92	0.63 (0.23, 1.03)	42.02± 16.48	0.25 (–0.23, 0.73)	35.86± 1.84	35.61± 1.49	36.20± 2.33	4, 207.30	3.38*	0.02 (–0.42, 0.37)	0.04 (–0.41, 0.33)	0.02 (–0.30, 0.34)
Post	19.43± 15.28		24.51± 15.64		37.90± 15.96		21.83± 2.36	22.60± 2.09	32.54± 2.59			0.60 (0.19, 0.99)	0.52 (0.14, 0.89)	0.03 (–0.36, 0.28)
BDI														
Pre	14.98± 9.07	0.86 (0.41, 1.31)	17.66± 8.55	0.99 (0.57, 1.39)	17.05± 10.38	0.46 (–0.02, 0.94)	16.81± 1.05	16.86± 0.85	16.38± 1.32	4, 204.37	3.67**	0.05 (–0.34, 0.44)	0.06 (–0.31, 0.43)	0.01 (–0.31, 0.33)
Post	7.33± 8.26		9.26± 8.41		12.38± 9.56		9.57± 1.30	8.08± 1.14	12.49± 1.45			0.29 (–0.10, 0.29)	0.42 (0.05, 0.79)	0.14 (–0.18, 0.46)

Pre = Assessment before treatment; Post = assessment after 8 weeks. * $p < 0.05$, ** $p < 0.01$. [a] Mean ± SD. [b] 95% CI given in parentheses. [c] Mean ± SE.

eral social platforms. The announcement provided general information about SAD. People who were interested were informed about the study aims and all gave written informed consent before their inclusion in the study. In addition to screening instruments, the Chinese version [5] of the Mini International Neuropsychiatric Interview (MINI) was administered to assess inclusion and exclusion criteria. In total, 197 individuals met the inclusion criteria (fig. 1).

In this study, we compared self-guided ICBT and therapist-guided ICBT to a wait-list control group. The self-guided ICBT program was derived from a well-studied ICBT program [6]. The original ICBT program was first translated literally into Chinese and then revised by 8 clinical psychologists. Cultural adaptations were made where indicated. The self-guided ICBT program is based on the principles of cognitive behavioral therapy for SAD. The content of the program consists of 8 text-based information modules including homework assignments such as progressive muscle relaxation training. The whole ICBT intervention took 8 weeks, and it was suggested to finish one module each week. In the self-guided condition, people could use this program without support. In the therapist-guided condition, patients could use the same program and additionally received minimal guidance. Guidance consisted of a weekly email by the supervising therapists. The therapists obtained information about patients, including the time of their last visit, the progress in the program, and the records of their exercise in an interface. Emails aimed to motivate and reinforce the participants' usage of the self-help program. The therapists spent approximately 15 min/patient/week on average to prepare the weekly message. Additionally, the therapists answered questions regarding the program and SAD upon request. Finally, some participants were assigned to a wait-list condition, completed questionnaires, and received the online treatment after 8 weeks.

Primary outcome measures were the Social Interaction Anxiety Scale (SIAS, $\alpha = 0.86$) and the Social Phobia Scale (SPS, $\alpha = 0.92$). The secondary outcome was the Beck Depression Inventory (BDI, $\alpha = 0.91$). All participants were asked to complete the questionnaires online before and 4 and 8 weeks after treatment.

Although this study was first planned as a randomized controlled trial, we were not able to maintain randomization due to the great interest in the study in combination with a lack of therapist capacity. To correct for the influence of selection bias due to nonrandomization, we used the propensity score method for three conditions [7]. For the calculation of the propensity scores, we included all baseline variables related ($p < 0.10$) to one of our two primary outcome variables. The baseline variables to estimate the propensity scores were gender, education, SAD, major depression disorder, age, socioeconomic status, and the baseline scores of the SIAS, the SPS, and the BDI. A visual inspection of the distribution of propensity scores showed a relatively large overlap in the different conditions, which indicates that they are comparable.

For the outcome analyses, we used a mixed model analysis approach to accommodate for missing data. Analyses were conducted using the MIXED command of SPSS 23 applying restricted

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maximum likelihood estimation. All analyses were based on the intention-to-treat sample.

In total, 95% of the sample was Han Chinese, the mean age was 24.6 years (SD = 5.1), and 73% were female. The sample consisted of 75 patients with SAD, 69 patients with comorbid SAD and major depression disorder, and 53 individuals with increased social anxiety symptoms but not meeting the criteria for SAD.

Observed scores for every condition, estimated marginal means based on mixed regression analyses with PS correction for each condition, results of the interaction condition × time, and within- and between-group effect sizes are shown in table 1. For both social anxiety measures the omnibus interaction effect was significant. Regarding the SIAS, pairwise comparisons using Bonferroni corrections at assessment after 8 weeks showed that both ICBT conditions were superior to the wait list (guided vs. wait list: $p < 0.001$; unguided vs. wait list: $p < 0.001$) and that there was no difference between the ICBT conditions ($p = 0.81$). Regarding the SPS, both ICBT conditions were superior to the wait list (guided vs. wait list: $p < 0.01$; unguided vs. wait list: $p < 0.01$), and the two active conditions did not differ ($p = 0.99$). For the BDI, the omnibus interaction effect was significant. However, none of the pairwise comparisons were significant.

The mean number of completed modules in the guided condition was 5.00 modules (SD = 3.30; median: 7) and in the self-help condition 4.51 modules (SD = 3.32; median: 3). This difference was not significant, $t(154) = 0.92$, $p = 0.36$.

The findings of the present study suggest that social anxiety symptoms can be effectively reduced by ICBT in Chinese people. Consistent with at least some previous studies [6, 8], we found that the effects of a self-guided ICBT intervention were not different from the effects of a guided ICBT intervention in social anxiety. Research suggests that adherence is improved when patients are guided by trained coaches [9]. However, despite the guidance by trained therapists, guided and unguided self-help did not differ significantly regarding the number of completed modules in the present study. Since therapist support was mainly focused on improving the adherence to the intervention, it is possible that a more intensive therapeutic support would have improved adherence and outcome in the guided condition [10].

According to epidemiological studies, there is a large unmet need for mental health treatment in China. ICBT seems to have the potential to quickly and widely disseminate effective evidence-based programs. This study provides preliminary support for guided and unguided ICBT for increased social anxiety symptoms. A major limitation is that although this study was first planned as a randomized controlled study, we were not able to maintain randomization, leading to an adaption of the applied statistical procedures. Besides, in the wait-list group, there were only patients with SAD.

Acknowledgement

This work was supported by NSFC 31571127.

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